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UNIT CONSTRUCTION COSTS FOR COMMERCIAL AND INDUSTRIAL BUILDINGS

APPRAISAL BULLETIN Number 30, published July 21, 1961, gave methods and figures for computing construction costs on a basic one-story commercial building. This current bulletin tells how to modify those costs for specifications that vary from the ones used in the basic building described last month.

The cost variations shown in these tables are for those most commonly found in new construction today. They are for average construction in the St. Louis Area, so adjustments should be made for buildings that are above or below average construction and for area price differentials. City-by-city variations from St. Louis costs may be secured from Wenzlick's Residential Appraisal Manual or from area modifiers that will be published once a year in our regular published service. Adjustments from these costs also will have to be made for buildings of less than 3,000 square feet or more than 10,000 square feet in floor area.

In the tables the standard specification costs used in last month's bulletin are shown in red. In this way you can determine the difference in area or perimeter costs due to variations from the standard specifications by adding to or subtracting from the unit costs in red. Suppose that the building that you are considering has a gypsum deck roof instead of the steel deck specified as standard last month. The area cost on the building used as an example in last month's bulletin averaged about \$3.86 per square foot. From Table 11, Roof Structures, you will find that the red item is \$1.05 per square foot cost on a 20-gauge steel deck with 40' clear span steel joists. This was the specification for the standard last month. To adjust the total base area cost for 2½-inch gypsum decking, read over to the next column in the same row because we still have 40' clear span steel joists. The change in roofing has increased unit costs on roofing to \$1.15, or an increase of \$.10 per square foot. If the base area is 5,000 square feet, the total base area cost for standard specifications of \$18,800 determined from the chart or table of last month's bulletin must be increased \$500 (5,000 x \$.10).

Following are the table and page numbers for the groups of variations in the standard specifications.

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TABLE 1
ASPHALT PAVING

6" base, 2" top, \$2.56/sq. yd. - .29/sq. ft.

This figure is based on a minimum of 5,000 sq. ft. Unit costs on smaller areas increase considerably with reduction of area.

TABLE 2
CEILINGS, FINISHED

	Cost per Sq. Ft. Type of Structure			
	Wood frame	Steel joists	Concrete	Rigid frame
Metal lath and plaster	\$0.45	\$0.80	\$0.82	-
Acous. fibre on aluminum grid	0.66	0.66	0.66	\$0.68
Acous. fibre on steel grid	0.61	0.61	0.61	0.63
Gypsum acous. tile on concealed grid	0.92	0.92	0.92	0.94
Rocklath and plaster	0.34	-	-	-
$\frac{1}{2}$ " Sheetrock taped and painted	0.25	0.55	0.57	0.59
Acous. plaster on metal lath	0.55	0.90	0.92	0.94
Nail acous. tile to strips	0.54	0.61	0.61	0.71
Cement acous. tile to plasterboard	0.49	0.79	0.79	0.81

TABLE 3
CONCRETE COSTS, MISCELLANEOUS

Sidewalks, patios, etc., 4"	\$0.61/sq. ft.
Drives, 4"	0.50/sq. ft.
Steps on grade	3.41/lin. ft. of riser
Steps, reinforced self-support	6.10/lin. ft. of riser
Porch slabs, loading docks, etc., on grade	0.84/sq. ft.
Porch slabs, loading docks, etc., reinforced on piers	1.96/sq. ft.
Retaining walls, reinforced concrete, including excavation and backfill, maximum height 10'	7.20/sq. ft.

TABLE 4

DOORS AND WINDOWS

Interior and Exterior Doors and Frames, Including Finish - No Screens

	Interior Steel Door & Frame 2'8"x6'8"	Interior Colonial 2'8"x6'8"	Interior Flush 2'8"x6'8"	Exterior Steel 3'0"x7'0"	Exterior Colonial 3'0"x6'8"	Exterior Flush 3'0"x6'8"
Complete cost per unit installed	\$67.10	\$68.97	\$61.87	\$133.70	\$83.24	\$90.32
Screen door wood	-	-	-	36.00	33.00	33.00
Comb. door alum.	-	-	-	48.80	48.80	48.80

Cost of overhead doors, \$3.11/sq. ft. including paint; overhead door operator, \$342 each. All interior doors, 1-3/8"; all exterior doors, 1-3/4". Add \$9.80 if 1-3/4" interior doors are used.

"A" Label Fire Doors

Opening Size of Door	Type	Cost	Installation	Cost/Sq. Ft. Installed
6'8"x7'6"				
50 sq. ft.	gravity sliding	\$ 320.86	\$122.00	\$ 7.64
4'9"x8'6"				
40.38 sq. ft.	gravity sliding	276.94	97.60	9.27
4'6"x7'6"				
33.75 sq. ft.	gravity sliding	251.32	97.60	10.33
3'9"x7'0"				
26.25 sq. ft.	gravity sliding	233.02	91.50	12.36
9'0"x12'0"	surface mounted			
108 sq. ft.	roll-up	1,039.44	146.40	10.98

Windows and Miscellaneous Openings, Based on Glazing and Installation Including Finish

Cost per Square Foot

	Full Screen	Sliding	Casement	Awning	Double Hung	Comm. Proj.	1/4" Pol- ished Plate Sliding Door
Aluminum	\$0.32	\$2.52	\$3.71	\$3.83	\$3.66	-	\$3.55
Alum., heavy duty	-	-	-	-	7.40	\$4.88	-
Steel	0.48	-	4.28	-	-	2.68	-
Wood	0.61	-	5.16	4.67	4.46	-	7.03

For 5/8" insulating glass in sliding doors add \$1.30/sq. ft.

1" insulating glass costs \$4.27/sq. ft. installed.

1/4" polished plate costs \$1.83/sq. ft. installed.

Most contractors do not take out openings in exterior walls less than 20 sq. ft.

Cost of preparation of the opening (plumbing jambs, setting sills, etc.) offsets saving of labor and material in the wall.

TABLE 5

ELECTRICAL WORK

Buildings with an average number of outlets will have the following costs per square foot of floor area based on the type of wiring used. These costs do not include power wiring or fixtures.

	Cost per Sq. Ft.
Nonmetallic sheathed cable	\$0.56
Thin wall conduit	0.74
Rigid conduit	0.88

TABLE 6
FLOOR SYSTEMS

		Concrete Slab on Grade, 4" Rock Sub-Base	2x10x12' Joists 16" O. C. 100# Live Load Plywood Sheath	12" Bar Joists 2' Plywood Sheath 20' Span	12" Bar Joists 2' Corru. Steel & 2" Conc.	Precast Conc. Struct. Poured Slab
	Unit Cost per Sq. Ft.	\$0.67	\$1.61	\$1.47	\$1.90	\$2.30
25/32"x2-1/4" select oak strip	\$0.59	1.26	2.20	2.06	2.49	2.89
5/16"x9"x9" parquet oak block wood	0.97	1.64	2.58	2.44	2.87	3.27
"B" group asphalt	0.29	0.96	1.90	1.76	2.19	2.59
"C" group asphalt	0.37	1.04	1.98	1.84	2.27	2.67
"D" group asphalt	0.43	1.10	2.04	1.90	2.33	2.73
3/32" Vinyl asbestos	0.73	1.40	2.34	2.20	2.63	3.03
Linoleum	0.98	*	2.59	2.45	2.88	3.28
Vinyl tile	1.16	1.83	2.77	2.63	3.06	3.46
Rubber	1.10	*	2.71	2.57	3.00	3.40
Terrazzo	1.16	1.83	*	2.63	3.06	3.46

*Not applicable.

TABLE 7
FOUNDATION AND EXCAVATION

Excavation	Cu. Yd.	42" Trench x 2'6" Lin. Ft.	12" Trench x 2'6" Lin. Ft.
Earth-machine excavation	\$0.88	\$1.19	\$0.60
Grading and backfill	2.68	0.69	0.23
Hand excavation	9.76	-	-
Hand grading	8.64	-	-

Concrete Foundation Including Forms	Cu. Ft.	Cu. Ft. Reinf.	Lin. Ft. 2'0"x8" Plain	Lin. Ft. 2'0"x8" Reinf.
Footings	\$0.90	\$1.48	\$1.20	\$1.97

	12" Conc. Block	8" Wall Plain Conc.	8" Wall Reinf. Conc.	12" Wall Plain Conc.	12" Wall Reinf. Conc.
Foundation per sq. ft.	\$1.32	\$1.16	\$1.48	\$1.46	\$1.78
4' average wall	5.28	4.64	5.92	5.84	7.12

Use above figures to obtain the following costs per lineal foot for average height of reinforced foundation wall.

	4'0" high x 8"	2'0" high x 8"	4'0" high x 12"	2'0" high x 12"
Excavation	\$1.19	\$1.19	\$1.19	\$1.19
Footings	1.97	1.97	1.97	1.97
8" foundation	5.92	2.96	7.12	3.56
Grading & backfill 1/5 cu. yd.	0.54	0.54	0.54	0.54
Total Cost per Lin. Ft.	\$9.62	\$6.66	\$10.82	\$7.26

TABLE 8

HEATING AND AIR CONDITIONING

The Appraisal Bulletin of July 21, 1961, indicated the wide range of costs in heating and air conditioning systems. While gas-fired unit heaters can be installed for 35¢ per square foot of floor area, a more realistic figure for a really adequate system in the St. Louis area is more like 54¢ per square foot. Following are average costs per square foot of floor area for various types of heating and air conditioning systems used in the St. Louis area.

Gas-fired unit heaters	\$0.54
Steam or hot water coil unit heaters with boiler	0.93
Gas-fired forced air furnace	0.97
Oil-fired forced air furnace	1.02
Hot water radiant heat	1.93
Combined forced air heat and refrigerated cooling	2.42

TABLE 9

PARTITIONS

	Unit Cost per Sq. Ft.	2"x4" Wood Studs	4" Conc. Block	3" Gyp. Block	2½" Metal Studs	3-5/8" Metal Studs
No finish	-	\$0.31	\$0.98	\$0.89	\$0.43	\$0.44
½" plasterboard, 1 side	\$0.25	0.56	*	1.14	0.68	0.69
½" plasterboard, 2 sides	0.50	0.81	*	1.39	0.93	0.94
Rocklath & plaster, 1 side	0.34	0.65	*	1.23	0.77	0.78
Rocklath & plaster, 2 sides	0.68	0.99	*	1.57	1.11	1.12
¾" plaster, 1 side	0.33	*	1.31	1.22	*	*
¾" plaster, 2 sides	0.66	*	1.64	1.55	*	*
Metal lath & plaster, 1 side	0.45	0.76	1.43	1.34	0.88	0.89
Metal lath & plaster, 2 sides	0.90	1.21	1.88	1.79	1.33	1.34
Prefin. plywood panel, 1 side	1.15	1.46	*	2.04	1.58	1.59
Prefin. plywood panel, 2 sides	2.30	2.61	*	3.19	2.73	2.74

*Not applicable.

Plasterboard costs include taping joints and one coat of paint.
plastered walls.

No painting is included on

TABLE 10

PLUMBING

Average cost of plumbing installation is in the neighborhood of 60¢ per square foot of building area. Use of cost per fixture is more accurate. Average cost per fixture is \$226 not including service lines. These should cost about \$610 unless the distance to the main is more than 100 feet.

TABLE II
ROOF STRUCTURES

	Unit Cost per Sq. Ft.	3/4" Wood or 1/2" Plywood	20-Gauge Steel Deck	2 1/2" Gyp. Deck	Precast Conc.	Poured- in-Place Lt. Weight Concrete
16' span 2x10 - 16" o.c. and structural steel beams	\$0.68	1.06	1.11	1.21	1.23	1.22
40' clear span steel joists	0.62	1.00	1.05	1.15	1.17	1.16
20' clear span steel joists and structural steel beams	0.58	0.96	1.01	1.11	1.13	1.12
Rigid frame	0.94	*	1.37	1.47	1.49	1.48
Precast concrete joists	1.22	1.60	1.65	1.75	1.77	1.76

*Not applicable.

TABLE 12
ROOFING AND INSULATION

	Cost per Sq. Ft.
15-yr. built-up roof	\$0.19
1/2" rigid insulation	0.10
1" rigid insulation	0.15
1 1/2" rigid insulation	0.23

Full thick (3 1/2") batt insulation = 15¢/sq. ft. of area.

TABLE 13
SPRINKLER SYSTEMS

Determination of the cost per square foot of floor area on sprinkler systems is dependent on several factors: 1. type of head used; 2. type of ceiling to which the system is attached; 3. dry or wet system; 4. heads concealed or exposed; 5. nature of occupancy of the building; 6. spacing of the heads. The scope of this report does not allow us to cover all these factors. Therefore, the costs indicated are intended to provide an average cost factor that will apply to most buildings being appraised.

Cost per square foot of floor area of sprinkler systems decreases considerably as the size of the building increases.

	Wet System		Dry System	
	Exposed Head	Concealed Head	Exposed Head	Concealed Head
Under 5,000 sq. ft.	\$0.96	\$1.08	\$1.11	\$1.23
5,000 sq. ft.	0.76	0.88	0.91	1.03
10,000 sq. ft.	0.68	0.79	0.76	0.87
15,000 sq. ft.	0.57	0.68	0.62	0.73

TABLE 14
STORE FRONTS

Glass and aluminum store fronts - average cost \$5.37/sq. ft. of area including aluminum 1/4" plate glass door. However, this cost is based on an average installation. Special sections, special glass, etc., can raise costs considerably. See Table 4 for insulated glass costs.

TABLE 15
WALL STRUCTURES

Type of Wall	Cost per Sq. Ft.				
	No Int. Finish	Plaster on Wall (+\$0.31)	Furr. Wall & Plaster (+\$0.44)	Furr. Wall & Plaster- board (+\$0.38)	Furr. Wall & Plywood Panel (+\$1.28)
4" face brk. with 8" conc. blk. backup	\$3.05	\$3.36	\$3.49	\$3.43	\$4.33
12" conc. blk.	1.61	1.92	2.05	1.99	2.89
8" conc. blk.	1.34	1.65	1.78	1.72	2.62
Steel frame and sheath	1.05	*	1.49	1.43	2.33
4" face brk. with 4" conc. blk. backup	2.64	2.95	3.08	3.02	3.92
Porcelainized steel curtain wall	3.66	*	4.10	4.04	4.94
Insulated aluminum panel const.	2.44	2.75	2.88	2.82	3.72
4" stone veneer with 8" conc. blk. backup	4.09	4.40	4.53	4.47	5.37
Aluminum curtain wall	3.50	*	3.94	3.88	4.78

*Not applicable.

Add insulation to furred wall construction - 12¢ per sq. ft. Cost of curtain wall type construction can vary considerably. Price range is \$3 to \$14 per sq. ft. Considerable judgment must be exercised in these. See note at the bottom of Table 4.

Thomas W. Kirk
THOMAS W. KIRK, P. E.

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